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KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

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CREPEAU, JONATHAN	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/700,833
Filing Date: June 07, 2001
Appellant(s): DUEBEL ET AL.

Richard L. Mayer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 14, 2005 appealing from the Office action mailed October 14, 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

This appeal involves claims 17-31.

Claims 32-40 are allowed.

Claims 1-16, 41, and 42 have been canceled.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

US 6,120,925	Kawatsu et al.
US 5,630,679	Buswell et al.
US 6,165,633	Negishi
US 6,077,620	Pettit
US 6,455,182	Silver
EP 1161991	European Patent Office

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 17, 19, 30, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawatsu et al (U.S. Patent 6,120,925). Regarding claim 17, the reference is directed to a fuel cell system comprising a reformer unit (32), a fuel cell unit (20), and a CO selective oxidation device (34) disposed between the reformer unit and the fuel cell unit (see Fig. 1). As shown in

Figures 7 and 8 and described in column 14, line 46 et seq., a water injection device (80) is disposed at the oxidation device and is configured to inject water therein. Regarding claims 19 and 30, the material to be reformed is liquid methanol (see col. 10, line 44). Regarding claim 17, although the injected water does not participate in the oxidation of CO into CO_2, the water is at least *capable of* participating in the reaction. Thus, the device of Kawatsu is "configured to" convert carbon monoxide into carbon dioxide by a reaction of carbon monoxide with oxygen supplied by the water injected by the water injection device, as recited in claim 17.

Thus, the instant claims are anticipated.

Claims 17, 22-25, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al (U.S. Patent 5,630,679) in view of Kawatsu et al.

Regarding claims 17 and 28, Buswell et al. is directed to a fuel cell system comprising a reformer unit (168), a fuel cell unit (186), and a CO selective oxidation device (142) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claim 30, the raw material is a hydrogen-containing material such as natural gas (see col. 7, line 38). Regarding claims 22, 28, and 29, the system comprises a two-stage compressor (130, 134) configured to supply compressed air to a cathode of the fuel cell unit (see col. 6, line 50 et seq.). Regarding claim 28, expanders are disposed in the cathode exhaust stream and are connected to the

compressors via common shafts (see Fig. 1). Regarding claims 23 and 24, the system comprises water separators (i.e., condensers) (188, 189) disposed in the cathode and anode exhaust streams. The separated water is supplied to a point upstream of the reformer (see col. 8, lines 12-16). Regarding claim 25, a water circulation loop (42, 43) is configured to cool the fuel cell (see Fig. 1).

Buswell et al. do not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17 and 28.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Buswell et al. In the abstract, Kawatsu et al. teach the injection of water into their oxidation unit "enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel." Accordingly, the artisan would be motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Buswell et al.

Claims 17-21, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi (U.S. Patent 6,165,633) in view of Kawatsu et al.

Regarding claims 17, 18, and 20, Negishi is directed to a fuel cell system comprising a reformer unit (31), a fuel cell unit (40), and a CO selective oxidation device (26) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claims 19, 30, and 31, the material to be reformed is liquid methanol (see col. 12, line 2). Regarding claim 18, the system includes a drive system of a motor vehicle (see col. 10, line 62). Regarding claims 20 and 21, the reformer includes a mixer configured to mix the methanol and an oxygen-containing substance (e.g., air) (see Fig. 1; col. 17, line 38 et seq.).

Negishi do not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17, 20, and 28.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Negishi. In the abstract, Kawatsu et al. teach the injection of water into their oxidation unit "enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel." Accordingly, the artisan would be

motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Negishi.

Claims 17-19, 26, 27, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pettit (U.S. Patent 6,077,620) in view of Kawatsu et al.

Regarding claims 17, 18, and 26, Pettit is directed to a fuel cell system comprising a reformer unit (2), a fuel cell unit (16), and a CO selective oxidation device (14) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claims 19, 30, and 31, the material to be reformed is liquid methanol (see Figure 1). Regarding claim 18, the system includes a drive system of a motor vehicle (see col. 1, line 44; col. 3, line 52). Regarding claim 26, a catalytic burner (28) is configured to combust exhaust gas (20) from the anode and to direct waste heat to the reformer via line 32 (see Fig. 1). Regarding claim 27, the burner is connected to a supply tank for supplying raw methanol (50) (see Fig. 1).

Pettit does not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17, 18, and 26.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Pettit. In the abstract, Kawatsu et al.

teach the injection of water into their oxidation unit "enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel." Accordingly, the artisan would be motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Pettit.

(10) Response to Argument

It is the Appellant's position that the Kawatsu reference, applied under 35 USC 102 herein, does not teach an oxidation device that is "configured to" convert carbon monoxide by a reaction with oxygen supplied by injected water. However, the Examiner maintains the position that all of the structural limitations of instant claim 17 are present in the oxidation device of Kawatsu. It is acknowledged that in Kawatsu, injected water functions to cool the catalyst and does not participate in the oxidation reaction. However, it is submitted that the structure of the oxidation device of Kawatsu is such that it is at least *capable* of performing the claimed oxidation by the reaction of water (i.e., a "water-shift" reaction). In column 15, line 50, Kawatsu discloses the following regarding the catalyst of the oxidation device:

> In the first embodiment discussed above, the selective CO oxidizing catalysts **50** include an aluminum oxide carrier with the platinum catalyst carried thereon. Other available carriers include silicon oxides, zirconium oxides, cerium oxide, zinc oxide, calcium carbonate, copper oxides, iron oxides, titanium oxides, cobalt oxides, and yttria-partially-stabilized zirconia. Other available catalysts carried on the carrier include rare metals, such as Pd, Ru, Rh, Ir, and Au, and non-rare metals, such as Ni, Co, Cu, and Fe.

Thus, Kawatsu teaches a plurality of catalyst species, with platinum on alumina being preferred. It is submitted that these catalyst species are at least *capable* of catalyzing a water shift reaction, as evidenced by Silver, U.S. Pat. 6,455,182 (noble metal on ceria/zirconia) and EP 1161991 (Pt on zirconia/alumina, etc.). As such, because the Kawatsu apparatus employs catalysts substantially identical to those of Silver and EP '191, the Kawatsu catalyst would at least be *capable of* catalyzing the claimed water shift reaction. It is apparent that one or more reaction conditions in Kawatsu (e.g., temperature, reactant flowrates) must be performed differently since the injected water does not participate in the reaction. However, these reaction conditions relate to the *method in which the apparatus is operated.* As is well-settled, an apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP §2114). Here, the claimed apparatus is structurally identical to that of Kawatsu. Further, if the Examiner has a reason to believe that a functional limitation can be performed by the prior art structure, and a *prima facie* case is made, the burden shifts to applicant to prove otherwise. See *In re Swinehart*, 169 USPQ 226 (CCPA 1971); *In re Schreiber*, 44 USPQ2d 1429 (Fed. Cir. 1997). In this case, the Examiner has provided evidence that the Kawatsu apparatus is capable of performing the claimed reaction, and Appellant has not provided evidence that that apparatus of Kawatsu is not capable of performing the claimed reaction.

Appellant's citation of *In re Venizia* on page 7 of the Appeal Brief is noted. However, this case relates to the phrase "adapted to," which is not recited in the instant claims. As such, *Venizia* is not seen to be germane to the issues in the present application.

Additionally, the limitation in claim 17 reciting "wherein, based on the oxygen supplied by the water injected by the water-injection device, a reduced amount of a supplemental oxygen containing substance is supplied to the oxidation device" is also anticipated by the Kawatsu reference. The reference expressly discloses a supply of oxidizing gas in addition to injected water (see, e.g., Figure 3). The recitation that a "reduced amount" of such oxidizing gas is supplied is also seen as a method of operating the apparatus and as such does not distinguish over the Kawatsu reference.

It is noted that each of the rejections on appeal involves the Kawatsu reference. The arguments advanced by Appellants in sections (B)-(D) of the Appeal Brief are believed to be cumulative of the arguments set forth in section (A), which have been addressed above. As such, the arguments in sections (B)-(D) will not be further addressed herein.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Jonathan Crepeau
Primary Examiner
Art Unit 1746

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

APPEAL CONFEREE:

Conferees:

MICHAEL BARR
SUPERVISORY PATENT EXAMINER/Conferee